

AMENDMENT UNDER 37 C.F.R. § 1.111  
APPLICATION NO. 10/089,569  
ATTORNEY DOCKET NO. Q68831

### **REMARKS**

Claims 1-22 are all the claims pending in the Application. By this Amendment, Applicants amend claims 1-22 to correct minor informalities only. Since such amendments are made to correct minor, basic elements, Applicants submit that they do not narrow the scope of the claim and do not raise any Festo implications.

#### **Office Action Summary.**

Applicants thank the Examiner for initialing the Information Disclosure Statement, Form 1449A. However, the Examiner failed to acknowledge the claim for priority under 35 U.S.C. § 119(e), as well as the receipt of the translated priority documents. Therefore, Applicants respectfully request the Examiner to check the appropriate boxes on the Form PTO-326 indicating that the claim for priority is acknowledge and that the translated priority documents have been received.

In addition, the Examiner objected to the drawings. Furthermore, the Examiner rejected claims 1-22 under 35 U.S.C. § 112, second paragraph, for failure to particularly point out and distinctly claim the invention. Finally, the Examiner rejected claims 1-22 under 35 U.S.C. § 103(a).

#### **Objection to the Drawings.**

The Examiner has objected to Figure 2a for failing to designate that it is prior art. To address the Examiner's concern, Applicants amend Figure 2a to label it as -- PRIOR ART --. As well, the replacement drawing sheets included in the enclosed Appendix are believed to obviate the informalities in Figs. 2b and 6 mentioned in the PTO 948. Applicants respectfully request the Examiner therefore to withdraw the objection to the drawings.

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Rejection under 35 U.S.C. § 112 second paragraph.

The Examiner rejected claims 1-22 under 35 U.S.C. § 112, second paragraph because of claims not being in conformance to the US format. Applicants thank the Examiner for pointing out the reasons for rejecting the claims. With respect to claims 1-2 and 4-22, Applicants respectfully submit that they are now sufficiently definite in view of self-explanatory amendments, as shown in the attached Appendix.

However, with respect to the Examiner's rejection of claim 3, Applicants respectfully disagree and request the Examiner to reconsider this rejection in view of the comments, which follow. The Examiner has alleged that claim 3 is indefinite for failure to indicate whether the equation recited therein is based on the designer choice or on an experimental result. There is, however, no statutory requirement for the claim to recite the origins of an equation. Therefore, Applicants respectfully request the Examiner to either withdraw this rejection or justify it by citing an appropriate statute.

Finally, the Examiner rejected claims 1 and 20-22 for a lack of structural and functional relationship between the elements. Applicants respectfully disagree and request the Examiner to withdraw this rejection in light of the comments, which follow. Claim 1 recites a resonant cavity, and an active section creating the first section of the resonant cavity and a tunable section creating a second section of the resonant cavity. Therefore, the recited features of claim 1 are structurally connected. Furthermore, claims 20-22 are related to claim 19 by further defining the step of fabricating a fixed etched mirror on the front face of the laser die.

Applicants respectfully submit that an artisan of ordinary skill could now read this claim and understand the scope of patent protection sought to be protected. The MPEP, in §2173.05(a), states:

If the claims, read in light of the specification, reasonably apprise those skilled in the art both of the utilization and scope of the invention, and if the language is as precise as the subject matter

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permits, the statute (35 U.S.C. 112, second paragraph) demands no more.<sup>1</sup>

Since the language of the rejected claim would reasonably apprise an artisan of ordinary skill as to its scope, Applicants respectfully submit that the claim meets the requirements of 35 U.S.C. § 112, ¶ 2. Therefore, Applicants respectfully request the Examiner to withdraw this rejection.

Rejection under 35 U.S.C. § 103(a).

Claims 1-5, 10-12 and 17-18 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Karioja et al. (US 6192059) (hereinafter “Karioja”). Claims 6-9 and 13-16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Karioja in view of McClland et al. (US 6201629) (hereinafter “McCelland”). Finally, claims 6-9, 13-16, and 19-22 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Karioja in view of Uenishi Y et al.: “Tunable Laser Diode using a nickel Micromachined External Mirror” Electronics Letters, IEE Stevenage, GB, Vol. 32, no. 13, June 20, 1996, pages 1207-1208, XP000965745 ISSN:0013-5194 (hereinafter “Uenishi”). Applicants respectfully traverse this rejection and respectfully request the Examiner to reconsider this rejection in view of the comments, which follow.

*Claims 1-5, 10-12 and 17-18.*

Applicants respectfully traverse this rejection with respect to claims 1-5, 10-12 and 17-18, as now amended. Of these claims, only claim 1 is independent. Claim 1 requires:

wherein a total length of the cavity  
 $L = L_1 + L_2$  is less than or equal to 20  $\mu\text{m}$ .

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<sup>1</sup> Page 2100-147 of the MPEP Rev. 2, July 1996; right-hand column, lines 25-30; citing with approval Shatterproof Glass Corp. v. Libbey Owens Ford. Co., 758 F.2d 613 (Fed. Cir. 1985).

From hereinafter, this recited limitation will be referred to as “total length of the cavity” for the sake of linguistic convenience only. The Examiner asserts that claim 1 is directed to a tunable semiconductor laser and is obvious in view of Karioja. The Examiner asserts that Karioja’s distance between the diode laser 200 and the control element 202, which may be, for example, 25  $\mu\text{m}$  is equivalent to total length of the cavity as set forth in claim 1 (see page 4 of the Office Action). Applicants respectfully disagree with the Examiner. Applicants have carefully studied Karioja’s discussion of the length between the laser 200 and the control element 202, which is not similar to total length of the cavity as set forth in claim 1.

Karioja teaches a wavelength-tunable laser configuration with a laser source 200, a control element 202 and an external cavity 205 between the two. Also, Karioja teaches a substrate 204 which operates as a dichroic mirror, a tuning part 206 which also has a dichroic, movable mirrors and a front mirror 2001. Specifically, the external cavity is short and the control element 202 is electrically tunable, which means it changes the optical properties of the external cavity with a movement of at least one tuning part (see Fig. 2; col. 3, lines 24 to 49). Karioja further teaches that a distance between the control element 202 and the laser source 200 could be very small (col. 4, lines 23 to 28, lines 40 to 46).

However, Karioja teaches that a distance between the laser source 200 and the control element 202 maybe short and that the length may vary (see col. 4, lines 40 to 46) but it does not teach or suggest that the length of the cavity is equal to the length of the active section and the length of the tunable section. In fact, Karioja teaches that the length is usually a few tens of wavelengths of the laser source in all embodiments but that it can also be from zero to hundreds of wavelengths (see col. 4, lines 40 to 46). In short, Karioja teaches varying the length of the cavity but not varying the length of the cavity in accordance to the lengths of the active section and the tunable section.

Therefore, *total length of the cavity*, as set forth in claim 1 is not suggested or taught by Karioja, which lacks discussion of the total length varying depending on the length of the active section and the tunable section. In Karioja the cavity length does not equal to the sum of the

lengths of the active and the tunable sections. For these reasons, Applicants respectfully submit that independent claim 1 is patentably distinguishable from Karioja. Applicants therefore respectfully request the Examiner to withdraw this rejection of independent claim 1. Also, Applicants respectfully submit that claims 2-5, 10-12 and 17-18 are allowable at least by virtue of their dependency on claim 1.

*Claims 6-9 and 13-16.*

Claims 6-9 and 13-16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Karioja in view of McClland et al. (US 6201629) (hereinafter "McCelland"). Applicants respectfully traverse this rejection with respect to the dependent upon claim 1, claims 6-9 and 13-16. Applicants have already demonstrated that Karioja does not meet all the requirements of independent claim 1. McClland is relied upon only for its teaching of micro-mechanical mirror system.

The Examiner asserts that it would have been obvious to combine Karioja and McClland without indicating motivation for doing this (page 6 of the office action). However, an artisan of ordinary skill confronted with the problem of mode skipping while allowing a wide tuning range would never have even thought to consult a reference like McClland. This reference deals with movable mirrors and which are unrelated to the problem of tunable lasers and would not commend itself to such a person as a reference in which solutions to avoiding mode skipping might be found.

In fact, Karioja teaches away from using McClland. For instance, Karioja discusses two structures where micro-mirrors are used. First, an alignment of glass plate and the movable mirror for tuning the laser is discussed by criticizing it as requiring a great number of components for aligning the glass with the micro-mirror (see col. 1, lines 60 to 67).

Next, Karioja discusses an arrangement of one movable mirror integrated onto a common bench. However, Karioja teaches that benches with micro-mirrors are not commercially available as well as lacking durability and reliability (see col. 2, lines 1 to 12). Instead, Karioja suggests that one could create a better laser by manipulating the external cavity (see col. 2, lines 17 to 35).

In short, Karioja concentrates on manipulating the external cavity and avoiding micro-mirrors which require careful alignment, whereas McClland discusses only the micro-mirrors. Therefore, Karioja and McClland cannot be validly combined with each other in a rejection under 35 U.S.C. § 103(a).

In addition, those skilled in the art would need to make modifications not taught in the prior art, in order to combine the references in the manner suggested by the Examiner. As explained above, neither Karioja, nor McClland discloses a total length of the cavity  $L = L_1 + L_2$ . Therefore, total length of the cavity  $L = L_1 + L_2$  is a modification not taught by the prior art.

Clearly, McClland does not compensate for the above-identified deficiencies of Karioja. Together, the combined teachings of these references would not have (and could not have) led the artisan of ordinary skill to have achieved the subject matter of claim 1. Since claims 6-9 and 13-16 are dependent upon claim 1, they may be patentable at least by virtue of their dependency.

*Claims 6-9, 13-16 and 19-22.*

Finally, claims 6-9, 13-16, and 19-22 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Karioja in view of Uenishi. Applicants respectfully traverse this rejection with respect to claims 6-9, 13-16 and 19-22. Applicants have already demonstrated that Karioja does not meet all the requirements of independent claim 1, as now amended. Uenishi is relied upon only for its teaching of micro-mechanical mirror (MEM) system.

The Examiner asserts that it would have been obvious to combine Karioja and Uenishi without indicating motivation for doing so (page 6 of the office action). However, an artisan of ordinary skill would never combine the two references. In fact, Karioja incorporates by reference Uenishi's discussion of MEMs (see col. 2, lines 2 to 12). But Karioja does not come up with the present invention. Instead, Karioja teaches away from using Uenishi by suggesting that Uenishi's teachings of MEMs on benches is not commercially available, not durable, and not reliable (see col. 2, lines 1 to 12). Instead, Karioja suggests that one could create a better laser by manipulating the external cavity (see col. 2, lines 17 to 35). In short, Karioja concentrates on

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manipulating the external cavity and avoiding MEMs, which are “unreliable”. Therefore, Karioja and Uenishi cannot be validly combined with each other in a rejection under 35 U.S.C. § 103(a).

In addition, those skilled in the art would need to make modifications not taught in the prior art, in order to combine the references in the manner suggested by the Examiner. As explained above, neither Karioja, nor Uenishi discloses a total length of the cavity  $L = L_1 + L_2$ . Therefore, total length of the cavity  $L = L_1 + L_2$  is a modification not taught by the prior art.

Clearly, Uenishi does not compensate for the above-identified deficiencies of Karioja. Together, the combined teachings of these references would not have (and could not have) led the artisan of ordinary skill to have achieved the subject matter of claim 1. Since claims 6-9, 13-16 and 19-22 are dependent upon claim 1, they are patentable at least by virtue of their dependency.

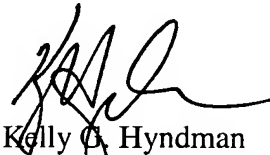
Conclusion and request for telephone interview.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly invited to contact the undersigned attorney at the telephone number listed below.

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Applicant files herewith as an Appendix two replacement drawing sheets. The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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